occupant side **224**, preferably near the neck area of the occupant. In this alternate embodiment, air exiting at the head and foot outlets facilitate cooling in these respective locations of an occupant that is in close proximity to the occupant side **224**.

Conditioned air **205** is able to cool the occupant of the seat, via an air flow path through the seat fabric, as well. Conditioned air traveling via the channels **214** is directed at and near the occupant through an air permeable seat covering **242**. A reticulated foam layer is omitted in this embodiment, though it can be added, if desired.

FIG. **8** shows a plurality of air channels **214** which are formed in the seat cushion foam **230**. This sectional view also shows a side support "wing" **239** of the seat, wherein the air channels do not occupy this region of the seat cushion foam. However, in an alternate embodiment, the channels can extend even into these areas of the seat, if desired.

Yet another embodiment of the foam air distribution channels as schematically shown in FIG. **7** is shown in FIG. **9**. Here the foam seat cushion **230** is of a foam density which is less than the foam density of the air channel forming foam **231**. Air channels **215** formed by the denser air channel foam **231**, cooperating with the automotive upholstery **242**, is used in place of the air channels **214** as schematically shown in FIG. **7**. An adhesive may be used to bond the automotive upholstery **242** to the air channel foam **231** at bond line **157**. A relatively non-permeable barrier **258**, constructed of a synthetic material, can be placed between the air channel foam **231** and the seat cushion foam **230** to provide for a pneumatic, moisture, or thermal barrier, as desired.

Another embodiment of the denser air channel foam **231** of FIG. **9** is shown in FIGS. **10A** and **10B**. Inlet conditioned air is supplied to a first plurality of channels **270**, which are oriented relatively perpendicular to the plurality of channels **214**, **215** as previously shown in FIGS. **7**, **8**, and **9**, and are also perpendicular to the second plurality of channels **272**, as shown in FIG. **10A**. The second plurality of channels **272** are oriented substantially similar to the plurality of channels as shown in FIGS. **7**, **8**, and **9**. Channels **270** cooperate with channels **272**, such that the conditioned air is able to pass from the first plurality of channels **270** to the second plurality of channels **272** via a plurality of overlapping common manifold areas **274**. A common manifold area **274** preferably occurs at each intersection of a first channel with a second channel.

The relatively dense air channel forming foam **231** of FIGS. **10A** and **10B** can be substituted for the foam **231** as shown in FIG. **9**, and may be used with or without the non-permeable barriers, as well as with or without the adhesive layers. The permeable automotive upholstery can be augmented or replaced, as desired, with a stitching embodiment as an air flow path to the occupant, as previously described.

The air channel forming foam **231** of the embodiments shown in FIGS. **9**, **10A**, and **10B** is preferably approximately 12 pounds per cubic foot and the seat cushion **230** foam is preferably approximately 6 pounds per cubic foot. However, other foam densities can be substituted for either type of foam, and other materials can be substituted for the various foam types. Any of the foam or foam-like materials described may be suitably cut, laser sculpted, molded, injected, stitched, glued, bonded or other such techniques as are known, in order to achieve the shapes desired to practice this invention.

If desired, an alternate embodiment of the seat as shown in FIG. **1** can be constructed for use in, for example, public

transportation systems, such as a subway, bus, or other passenger-carrying vehicle. The seat's foam **30** of FIG. **1** is replaced with a substantially stiff material, such as fiberglass reinforced ABS. The stiff "cushion" member preferably has air channels molded or cut into its structure. At least partially encapsulating the stiff "cushion" member is a substantially resilient member, preferably formed of a reticulated foam layer or the like. If desired, an air-permeable structural wall, such as a adhesive tape with holes, or a plastic screen with holes, can be placed between the reticulated foam layer and the stiff cushion or plastic seat. By adding this structural screen or tape, it is more difficult for an occupant to feel the channels in the stiff materials with either their body while they are sitting, or with their hands. This screen acts in a similar manner as the adhesive backed material described previously. The seat arrangement is covered so as to substantially encapsulate the plastic channel cushion, the plastic screen and the reticulated foam, for example, with seat covering material similar to that previously described. The seat components can be assembled via stitching, screwing, bonding, gluing, cutting, and other means of attachment as is known.

The practice of the invention disclosed herein provides an easy and preferable means with which to construct a variable temperature seat. This provides for a convenient manner for environmentally comforting the seat's occupant.

While only preferred embodiments of the invention are described herein in detail, the invention is not limited thereby. It is believed that the advantages and improved results of the invention will be apparent from the foregoing description. It will be apparent that various changes and modifications may be made without departing from the spirit and scope of the invention as sought to be defined in the following claims.

What is claimed:

1. Apparatus for selectively varying the environmental temperature of a vehicle seat comprising:

a support member in the seat formed from a resilient material, wherein the support member includes:

an integral air flow channel that extends through the support member from a bottom surface to a top surface of the support member, the air flow channel having an inlet at the bottom surface of the support member for receiving temperature conditioned air therein, and further having an outlet at the top surface of the support member for dispensing temperature conditioned air therefrom; and

at least one air subchannel integral with and extending along a top surface of the support member, wherein the air subchannel is connected with the outlet of the air flow channel; and

a porous member which substantially covers the top surface area of the support member, the porous member having an interface with the air subchannel; and

a seat cover that substantially encapsulates the porous member to the support member.

2. An apparatus as defined in claim **1** wherein the porous member comprises;

a first porous member that is disposed adjacent and substantially covers the top surface of the support member; and

a second porous member substantially encapsulating the first porous member.

3. An apparatus for selectively varying the environmental temperature of a vehicle seat comprising:

a seat cushion in the seat formed from a resilient material including:

an integral air flow channel extending vertically therethrough from a top surface of the seat cushion to a bottom surface of the seat cushion, wherein the air flow channel has an inlet adjacent the bottom surface of the seat cushion for receiving temperature conditioned air therein, and further has an outlet adjacent the top surface of the seat cushion for dispensing temperature conditioned air therefrom; and

a porous member which substantially covers the top surface area of the seat cushion;

at least one air subchannel that is integral with and extends along the top surface of the seat cushion, wherein the air subchannel is connected with the outlet of the air flow channel, and wherein the porous member is contact with the air subchannel; and

a seat covering substantially encapsulating the porous member to the seat cushion.

4. An apparatus for selectively varying the environmental temperature of a vehicle seat comprising:

a seat cushion in the seat formed from a resilient material including:

an integral air flow channel extending vertically therethrough from a top surface of the seat cushion to a bottom surface of the seat cushion, wherein the air flow channel has an inlet adjacent the bottom surface of the seat cushion for receiving temperature conditioned air therein, and further has an outlet adjacent the top surface of the seat cushion for dispensing temperature conditioned air therefrom; and

a porous member which substantially covers the top surface area of the seat cushion;

at least one air subchannel that is integral with and extends along the top surface of the seat cushion, wherein the air subchannel is connected with the outlet of the air flow channel, and wherein the porous member is contact with the air subchannel;

an air manifold integral with and extending along the top surface of the seat cushion, wherein the air manifold is interposed between the outlet of the air flow channel and the air subchannel to facilitate the distribution of temperature conditioned air therebetween; and

a seat covering substantially encapsulating the porous member to the seat cushion.

5. Apparatus for selectively varying the environmental temperature of a vehicle seat comprising:

a support member in the seat in the form of a resilient cushion, wherein the support member includes:

an air flow channel integral with the support member and extending therethrough from a bottom surface to a top surface of the support member, wherein the air flow channel has an inlet at the bottom surface for receiving temperature conditioned air, and an outlet at the top surface for dispensing temperature conditioned air;

at least one air subchannel integral with and extending along the top surface of the support member; and

an air manifold integral with and extending along the top outer surface of the support member between the air flow channel outlet and the air subchannel for dispersing temperature conditioned air from the air flow channel to the air subchannel; and

a flexible porous member disposed over the top surface of the support member and having an interface with the air subchannel; and

a flexible seat cover substantially encapsulating an outer surface of the flexible porous member.

6. The apparatus as recited in claim 5 wherein the resilient cushion can be selected from the group of materials consisting of cellular spongy material, foam, and fiberglass reinforced plastic.

7. The apparatus as recited in claim 5 wherein the flexible porous member comprises:

a first porous member substantially covering the top surface of the support member and having an interface with the air subchannels; and

a second porous member substantially encapsulating the first porous member.

8. A method for selectively varying the environmental temperature of a vehicle seat comprising the steps of:

routing temperature conditioned air from an air inlet to an air outlet of an air flow channel extending through a support member of the seat;

distributing temperature conditioned air from the air outlet along a top surface of the support member through at least one air subchannel disposed within the top surface;

passing temperature conditioned air from the air subchannels through a porous member disposed adjacent the outer surface, and then to a seat covering disposed adjacent the porous member.

9. A method as recited in claim 8 wherein the temperature conditioned air is routed from a bottom surface of the support member to a top surface of the support member.

* * * * *

10. An apparatus for selectively varying the environmental temperature of a seat, comprising:

a support member in the seat, the support member being formed from a first surface adjacent an occupant of the seat when in use and an opposing second surface further away from the occupant when in use;

an integral airflow sub-channel extending along the first surface of the support member, the sub-channel having walls, an inlet to receive temperature conditioned air, and an outlet at the first surface of the support member for dispensing temperature-conditioned air therefrom; and

a layer of air-permeable support material abutting the first surface of the support member and covering the airflow sub-channel.

11. An apparatus as defined in Claim 1, further comprising a seat covering substantially encapsulating the layer of air permeable support material to the support member.

12. An apparatus as defined in Claim 1, wherein the layer of air-permeable support material comprises a layer of adhesive-backed material.

13. An apparatus as defined in Claim 1, wherein the layer of air-permeable support material is substantially less stretchable than the resilient material of the support member.

14. An apparatus as defined in Claim 1, further comprising a porous member which substantially covers the layer of air-permeable support material.

15. An apparatus as defined in Claim 1, further comprising a liner placed in the flow sub-channel, the liner having paths for air to pass through the liner to the resilient material.

16. An apparatus as defined in Claim 6, wherein the liner is configured to resist crushing of the airflow sub-channel when the weight of a seat occupant is placed on the support member and the airflow sub-channel

17. An apparatus as defined in Claim 6, wherein the liner is affixed to the wall of the airflow sub-channel.

18. An apparatus as defined in Claim 1, wherein the airflow sub-channel comprises a first and second plurality of airflow sub-channels oriented perpendicular to each other.

19. An apparatus as defined in Claim 1, wherein the layer of air-permeable support material is adhered to the top surface of the support member.

20. An apparatus as defined in Claim 1, wherein the layer of air-permeable support material has a plurality of holes.

21. An apparatus as defined in Claim 1, wherein the temperature-conditioned air is routed from the first surface of the support member to the second surface of the support member.

22. An apparatus for selectively varying the environmental temperature of an occupant seat while an occupant sits on the seat, comprising:

a support member in the seat, the support member being formed from a resilient material and having a first surface adjacent the occupant when the seat is in use and a second surface further away from said occupant when the seat is in use;

an integral airflow sub-channel extending along the first surface of the support member, the sub-channel having walls, an inlet to receive temperature conditioned air and an outlet at the first surface of the support member for dispensing temperature-conditioned air therefrom;

a liner placed in the airflow sub-channel, the liner having walls with paths therethrough for air to pass through the liner toward the first surface; and

an intermediate porous member which substantially covers the first surface of the support member and having an interface with the airflow sub-channel.

23. An apparatus as defined in Claim 22, wherein the liner is affixed to the wall of the airflow sub-channel.

24. An apparatus as defined in Claim 22, further comprising a seat covering substantially encapsulating the porous member to the support member.

25. An apparatus as defined in Claim 22, wherein the airflow sub-channel extends from the second surface of the support member to the first surface of the support member.

26. An apparatus as defined in Claim 22, wherein the liner is configured to resist crushing of the airflow sub-channel when the weight of the seat occupant is placed on the support member and the airflow sub-channel when the seat is in use.

27. An apparatus as defined in Claim 22, wherein the temperature-conditioned air is routed from the first surface of the support member to the second surface of the support member.

28. A method for selectively varying the environmental temperature of a seat, comprising the steps of:

routing temperature-conditioned air from an air inlet to an air outlet of an airflow channel extending through a support member of the seat;

distributing temperature conditioned air from the air outlet along a top surface of the support member to at least one air subchannel disposed within the stop surface;

passing the air through an air-porous member positioned on the support member and over the at least one air subchannel; and

passing temperature-conditioned air from the air subchannels through the porous member and subsequently to a seat covering substantially encapsulating the air-porous member to the support member.

29. The method as recited in Claim 28, wherein the temperature-conditioned air is routed from a bottom surface of the support member to a top surface of the support member.

30. A method as recited in Claim 28, wherein the layer of material is selected to be substantially less stretchable than the resilient material of the support member.

31. A method as recited in Claim 28, comprising the further step of placing a liner in the flow channel and passing air through the flow channel to resist crushing of the flow channel when the weight of a seat occupant is placed on the support member and the flow channel.

32. A method as recited in Claim 28, comprising the further step of passing air through the liner to the resilient material.

33. A method as recited in Claim 32, comprising the further step of affixing the liner to the wall of the flow channel and passing the temperature-conditioned air through the liner as it is affixed to the walls.

34. A method as recited in Claim 28, wherein the air-porous member has a plurality of holes and the air passes through the holes.

35. A method as recited in Claim 28, wherein the air-porous member is adhered to the support member so that the air-porous member helps to resist collapse and blockage of the flow channel as air passes therethrough.

36. A method as recited in Claim 28, comprising the further step of passing the temperature-conditioned air through an intermediate layer interposed between the support member and the seat covering.

37. A method as recited in Claim 36, wherein the intermediate layer is selected to comprise a structural screen making it difficult for a seat occupant to feel the channels when the seat occupant is sitting on the seat.

38. A method as recited in Claim 28, comprising the further step of adhering the air-porous member to the support member.